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AdaNET KEY ISSUES SUMMARY REPORT

(NASA-CR-188241) AdaNET KEY ISSUES SUMMARY
REPORT (Softech) 10 p CSCL 098

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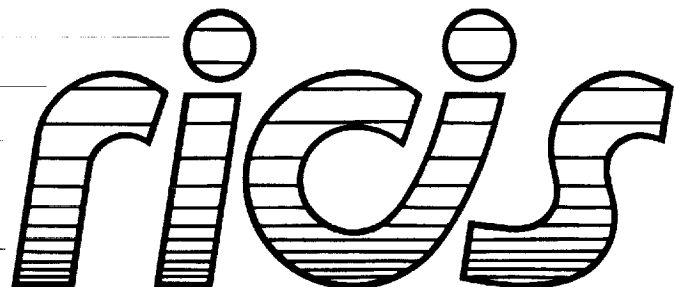
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SofTech, Incorporated

April 30, 1991

Cooperative Agreement NCC 9-16
Research Activity No. SE.18
Deliverable 2.1.3B

NASA Johnson Space Center
Information Systems Directorate
Information Technology Division



Research Institute for Computing and Information Systems
University of Houston - Clear Lake

T · E · C · H · N · I · C · A · L R · E · P · O · R · T

The RICIS Concept

The University of Houston-Clear Lake established the Research Institute for Computing and Information systems in 1986 to encourage NASA Johnson Space Center and local industry to actively support research in the computing and information sciences. As part of this endeavor, UH-Clear Lake proposed a partnership with JSC to jointly define and manage an integrated program of research in advanced data processing technology needed for JSC's main missions, including administrative, engineering and science responsibilities. JSC agreed and entered into a three-year cooperative agreement with UH-Clear Lake beginning in May, 1986, to jointly plan and execute such research through RICIS. Additionally, under Cooperative Agreement NCC 9-16, computing and educational facilities are shared by the two institutions to conduct the research.

The mission of RICIS is to conduct, coordinate and disseminate research on computing and information systems among researchers, sponsors and users from UH-Clear Lake, NASA/JSC, and other research organizations. Within UH-Clear Lake, the mission is being implemented through interdisciplinary involvement of faculty and students from each of the four schools: Business, Education, Human Sciences and Humanities, and Natural and Applied Sciences.

Other research organizations are involved via the "gateway" concept. UH-Clear Lake establishes relationships with other universities and research organizations, having common research interests, to provide additional sources of expertise to conduct needed research.

A major role of RICIS is to find the best match of sponsors, researchers and research objectives to advance knowledge in the computing and information sciences. Working jointly with NASA/JSC, RICIS advises on research needs, recommends principals for conducting the research, provides technical and administrative support to coordinate the research, and integrates technical results into the cooperative goals of UH-Clear Lake and NASA/JSC.

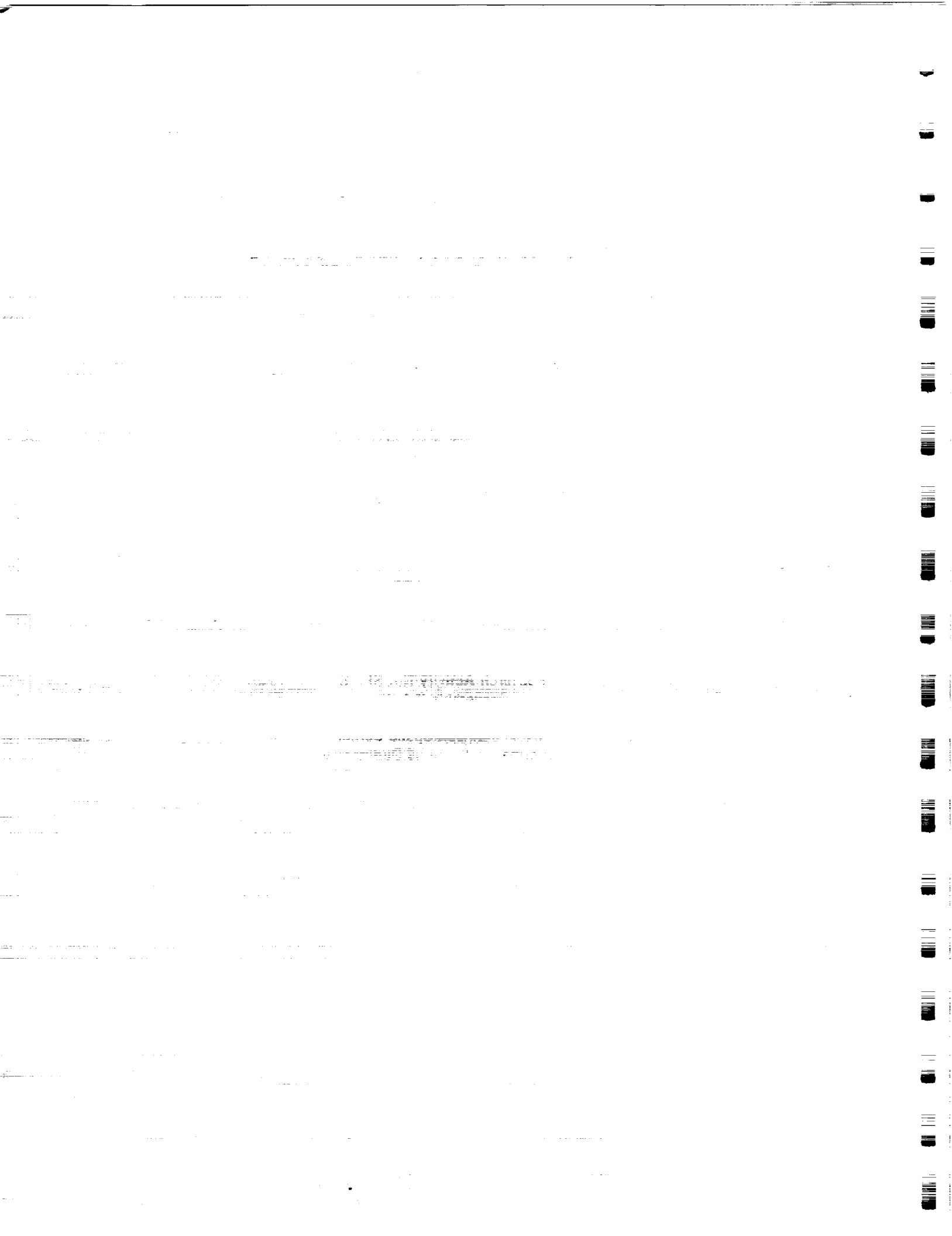
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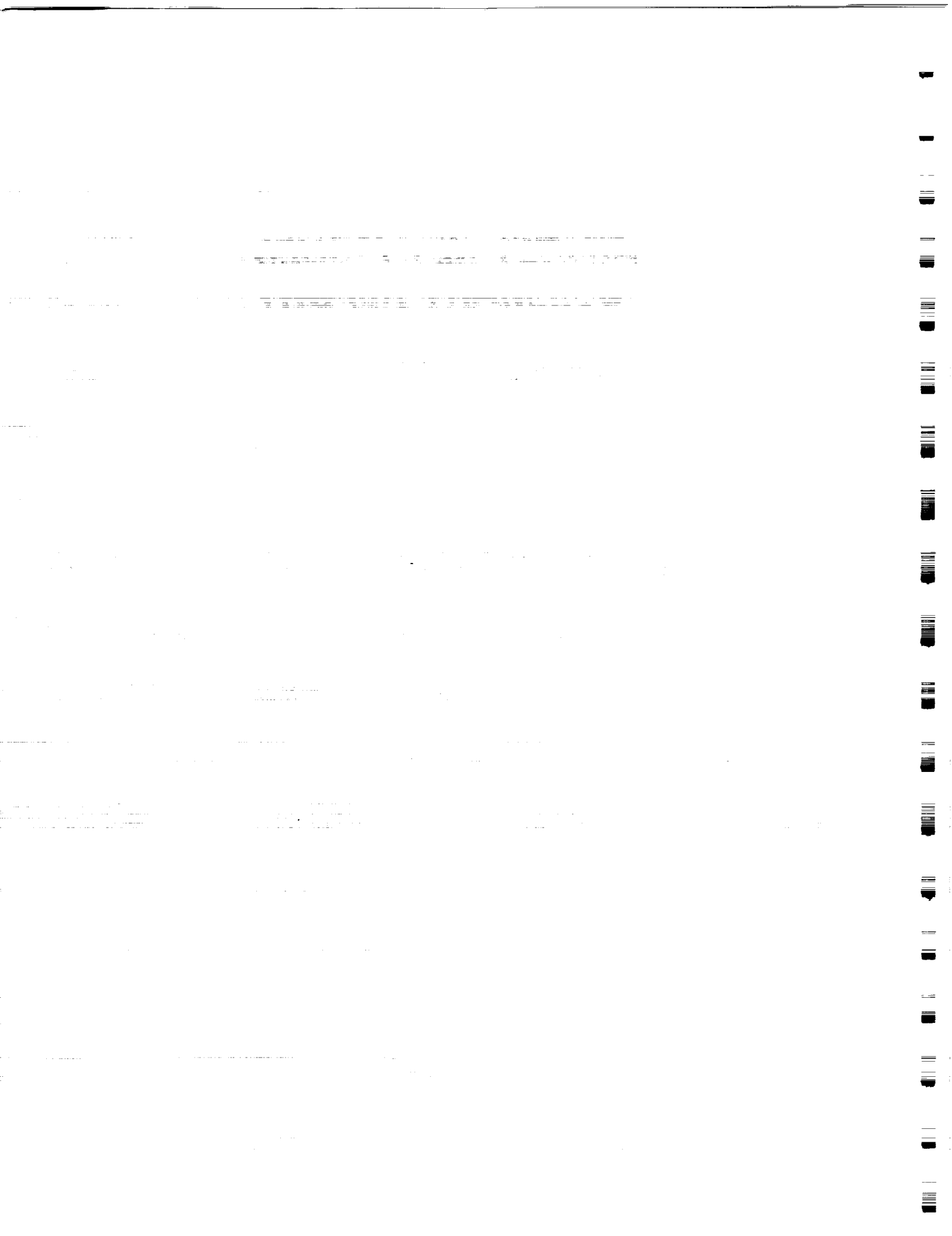
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***AdaNET KEY ISSUES
SUMMARY REPORT***



Preface

This research was conducted under auspices of the Research Institute for Computing and Information Systems by SofTech, Incorporated. Dr. Charles McKay served as RICIS research representative.

Funding has been provided by Information Technology Division, Information Systems Directorate, NASA/JSC through Cooperative Agreement NCC 9-16 between NASA Johnson Space Center and the University of Houston-Clear Lake. The NASA technical monitor for this activity was Ernest M. Fridge, of the Software Technology Branch, Information Technology Division, Information Systems Directorate, NASA/JSC.

The views and conclusions contained in this report are those of the author and should not be interpreted as representative of the official policies, either express or implied, of NASA or the United States Government.



AdaNet Key Issues Summary Report

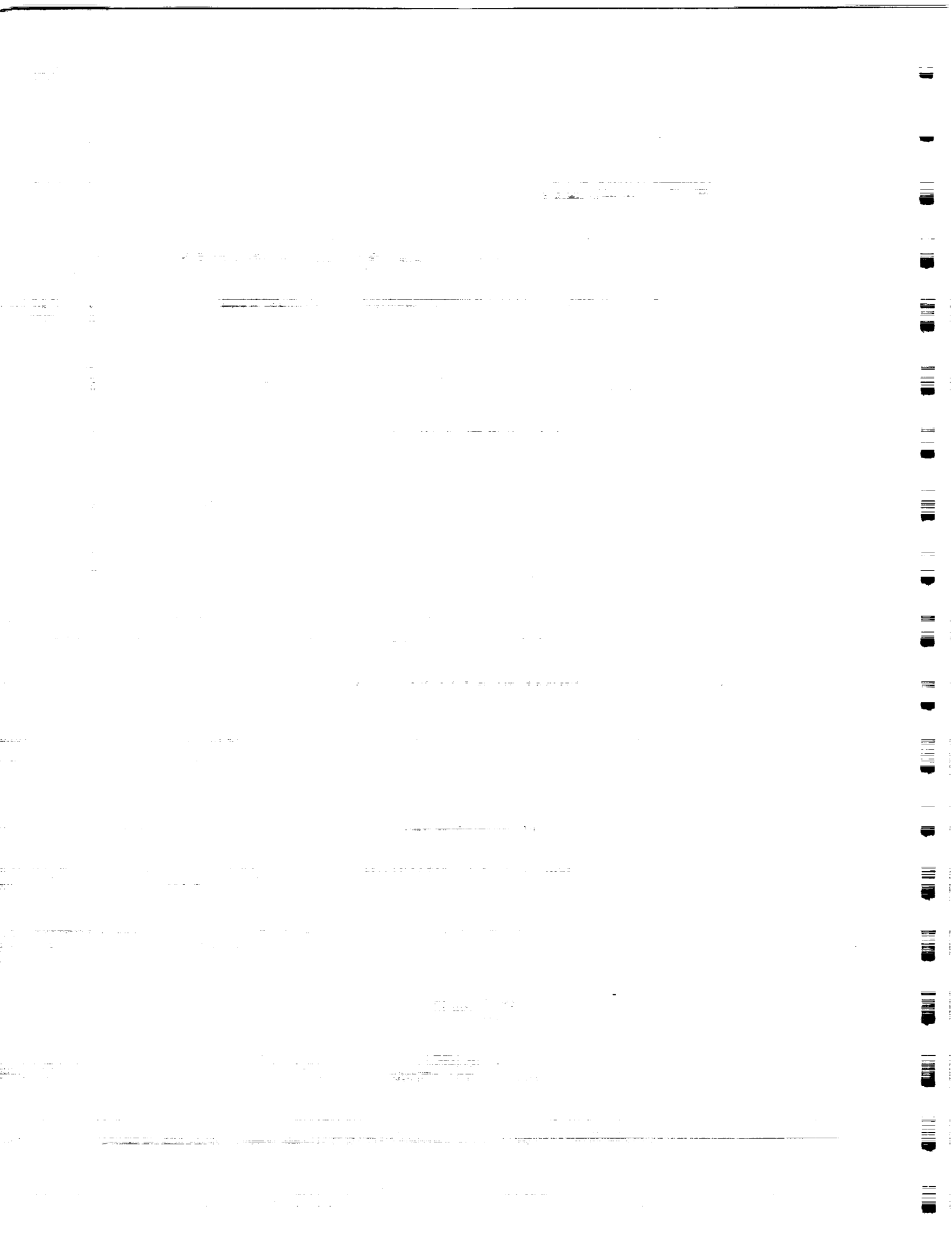
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AdaNet Key Issues Summary Report
April 30, 1991

Introduction

This report is the first in a series of reports planned to address key issues in the development of the AdaNet program. It is also a summary report reflecting the work of others on the AdaNet Team. In particular, the following reports have recently been or are concurrently being completed:

ASV3 Product Assessment
A Research Review of Quality Assessment for Software
Cooperative Processing User Interfaces for AdaNet

The report is intended to address the key issues as they relate to project planning in general, and research planning in particular. The report is concluded with a general recommendation for research to follow.

The AdaNet program has completed an assessment of the current on-line system, ASV2, and is preparing to provide a new system, ASV3, with similar capabilities as for ASV2, but with some specific new capabilities and improved potential for enhancement and evolution. Much of this report addresses the plans for ASV3 as they are understood at this time. Additional issues are raised by the Quality Management Research White Paper and by the recent experiences of SofTech, Inc. on other projects relating to reuse.

Selection of AutoLib for ASV3

There has been lengthy consideration of what platform (hardware and commercial or "off-the-shelf" software) to base ASV3 on. The most recent plans are based upon the use of the AutoLib system developed for JSC by Barrios. AutoLib, among others, has relevant capabilities and useful capabilities beyond those of ASV2. Assuming AutoLib as the ASV3 platform provides a basis for moving the project forward, but not without raising a number of detailed concerns (see following). It is important that short-term development support the longer-term needs for enhancement and evolution. This issue still warrants further planning than has been provided to date, specifically addressing:

The prototyping, development and subsequent deployment of ASV3
The operational transition from ASV2 to ASV3,
The planned capture of ASV3 capabilities for ASV4.

ASV3 Use of Autolib

In order for ASV3 to be successfully based upon Autolib, several details of functionality and user interface need to be worked out. These include:

- The nature and quality of dial-in access (including performance concerns),
- If and how Internet access will be provided, and
- How the additional functionality required to support user downloading of files and message requests to the operational staff (for bulk requests or other assistance) will be provided.

While it is not anticipated that these issues cannot be satisfactorily resolved, their resolution will take time and development effort. Thus these are primarily programmatic issues which impact on the schedule and quality of ASV3 development. Issues which follow are more research oriented and impact primarily on research and the definition of ASV4.

Quality Engineering and its Implications for AdaNet

There are two principle benefits to be sought from reuse in software engineering, not only the more obvious benefit of productivity improvements but quality improvements as well. It is part of the AdaNet charter to insure that the AdaNet repository provide a resource which adds to the quality of systems which draw from it.

The Quality Management Research White Paper is a detailed review of software quality assessment as it is understood today. Unfortunately, there is not a clear consensus today of what, in detail, software quality is and how to measure it. There are research developments which suggest how we might provide a metric or various metrics, which relate to software quality. There are further developments which suggest how to assess the development process and its impact on quality, what might be documented in a pedigree for software components. Both of these are of interest to the project.

Quality measures will be an important part of a reuser's assessment of potential for any given component found in the repository. To play an active role in promoting reuse we must be involved in the assessment of quality and how to express it. While the strongest recommendation might be reserved for components which are re-engineered within the project, with particular emphasis on quality, this should not be a limiting factor in the size of the repository's holdings. Thus metrics and the pedigree of acquired software are critical. Since this is an emerging science we must take our part in establishing as well as researching the field.

Lessons Learned From Related Efforts

SofTech, Inc. has been involved for several years now in the support of reuse both through analysis of how best to implement reuse and through the development and maintenance of a software repository. That experience has lead lately to a more active participation in the process of reuse. Following the development and initial population of a repository, it was felt necessary to both seek out larger units of software and to actively find sources and potential targets for these larger software units.

This has been a more involved approach to the problem of reuse, dealing with the process of development and inserting reuse engineering. So far it has been a gratifying effort and bears consideration for AdaNet. In particular, the repository tool, while recognizably an important part of the reuse equation, may not have any success standing by itself.

It is not clearly a part of the current planning for AdaNet to play an active role in finding sources and targets and implementing the analysis and design necessary to make reuse successful. At least this should be a research topic with planned activity spanning the project's lifetime. (Note this would fall under the research topic of Reuse Technology and Engineering for Reuse, but is a significantly larger task than the existing Support for and Study of Exemplary Projects tasks).

Research Thrusts for the Second Half of Calendar 1991

In general, the research activities which have significance in the next half-year can be grouped into two areas:

- Reuse Technology - including, initially at least, follow-on work in quality management and including, if desired, active participation in reuse engineering, and
- Library Technology - including additional work on cooperative user interfaces, object management systems and classification schemes

Reuse Technology research focuses on how reuse is factored into the software development process. Quality management research addresses what measures and attributes can be provided which will assist the reuser in using a repository and selecting components for reuse. The quality management research will also provide for lessons learned and process related recommendations which can be incorporated into the holdings and potentially offer unique benefits from the repository to those willing to adopt specific approaches. Other research in reuse technology is critical to ensuring the acceptance and adoption of reuse.

Library Technology research focuses on the organization and presentation of the reuse repository, and ultimately, its integration into a larger CASE (Computer Aided Software Engineering) framework. For AdaNet, the ability to interact effectively and conveniently from remote sites is a unique and significant concern for which cooperative user interfaces provides a promising approach. Additional research in object management is important to providing a current and effective tool. Lastly, it is clear that software cataloging and classification is a significant part of the challenge to making reuse a realistic alternative for software engineering.

